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Constructed wetland pilot units for wastewater treatment in the tannery industry

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Abstract

Constructed wetlands can be used for primary and secondary treatment of domestic wastewaters and for the treatment of a variety of other water sources including stormwaters, landfill leachate, industrial and agricultural wastewaters and acid mine drainage.

For the treatment of tannery wastewater no detailed studies using constructed wetlands are known in the literature. Frequent problems occur in this industry concerning the effluent with high organic loadings. In these situations, a constructed wetland can be potentially used to support the existing wastewater treatment.

The present study refers to the applicability of subsurface horizontal flow constructed wetlands for the treatment of tannery wastewater in two series of pilot units planted with *Typha latifolia* and *Phragmites australis*.

The units were subject to different hydraulic loadings, 180 mm/d and 60 mm/d, and the organic matter removal efficiency was evaluated. The average COD for the inflow of the units was 1579 mg/l for an hydraulic loading of 180mm/d (1421 KgCOD/had) and 1297 mg/l for an hydraulic loading of 60mm/d (385 KgCOD/had). Maximum removal efficiencies, in terms of COD, for hydraulic loading of 180 and 60 mm/d in *Typha* unit were 63% and 92%, respectively. For *Phragmites*, the maximum values were 64% and 92%.

The decrease in COD, BOD_5 and TSS at the outflow of the units was found to increase with their influent values in a linear correlation. This behavior corresponds to a first order kinetics, showing that the pollutant removal rate was proportional to the influent strength. There was no significant difference between the two systems in series, indicating that the type of plant did not influence the treatment performance.

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